Question one

“How do teaching methods in maths differ between the East and the West, and to what extent do these differences impact the identification and management of dyscalculia?”

Contrasting teaching methods and implementation in maths education is something that’s disputed across the globe, as maths is an international subject which transcends language or culture, it’s easy to see the different ways that it is taught in different countries. Understanding these differences and perhaps implementing them into our own educational systems to improve the way that we shape the future generations could be the way forward.

Eastern countries like China, Korea and India are often associated with their prodigious maths abilities in many areas like engineering, chemistry or computer science but how much do mathematical difficulties effect the population compared to England?

Source one

<https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023410311>

In this systematic review, the rates of mathematical difficulties (MD) in China in children under 12 are slightly higher than the UK however, other studies have obtained different numbers when screening for MD in the countries, ranging from 3.3% to 13.8% which is a massive difference when trying to compare the East and West.

The classification of MD and the fields which exclude children from being screened like the Mathematics Achievement Test could be different across the studies which results in varying percentages. Research for dyscalculia is around 20 years behind the research into that of dyslexia and other learning difficulties which is why they can’t properly identify MD in children, with enough accuracy to make an informed evaluation.

Source two

<https://www.frontiersin.org/articles/10.3389/fnhum.2021.687476/full>

An interesting part of this study is the finding that the dyscalculia group is unable to assign Arabic numerals values, which means that their Symbolic Number System (SNS) is underdeveloped or not working as intended.

The Core Number System is also partially responsible for the development of the Symbolic Number System (SNS) and they work hand in hand to decipher symbolic numbers and non-symbolic numbers. The symbolic nature of Asian languages which use numbers a lot more in day to day vocabulary and writing could be the cause of less cases of MD.

Question two

“Is maths something humans discovered or something we created?”

The philosophy of maths has fascinated me for a long time, ever since I was a kid, learning about algebra, pi or sine waves, these abstract topics are really thought provoking when asked the question “Would they exist without human thought?”.

Platonism suggests that numbers or shapes exist in the space of abstract objects, they are waiting for humans to come along and discover them.

On the other hand, Causal Interaction says that maths is a human invention, something we’ve created to understand the world and give reasonable answers to perhaps unanswerable questions.

Intuitionism suggests that human intuition and basic logical reasoning are the main driving factors of creating maths concepts. It says that we have defined what is true and that we alone are the arbiters of truth and continuity within maths.

These philosophical viewpoints are very closely related to human cognition and how we think as a species. Understanding if maths is a discovery or invention could have monumental implications for education, alien communication (maybe not) and our understanding of the universe.

Source one

<https://plato.stanford.edu/entries/philosophy-mathematics/#AntRemStr>

This source by the university of Stanford delves into the context of maths philosophy and it is perhaps too much to read during this part of the epq but I will definitely be coming back to it to look at more detail surrounding the topics.

Source two

<https://en.wikipedia.org/wiki/Pioneer_plaque>

An example of philosophical maths being used in the real world would be on the plaques of the pioneer 10 and 11 spacecraft that were sent to Jupiter and Saturn, the first of their kind to reach escape velocity and go past the asteroid belt. Focusing on the top of the plaque, there are two circles with a line between which represents the hyperfine transition of hydrogen in which an electron flips. This takes 1420.405 MHz which is then used in the spiral pattern as the unit to show the epoch (where the planets were located) at the time of the launch of the craft.

Ingenious ways like this uses maths to communicate interglacially in the hopes of reaching another species of intelligent life. Using universal units of hydrogen, which is the most abundant element in the universe, showcases the intersection of mathematics and philosophy in the quest to connect with extra-terrestrial intelligence through universally understood principles.

These mathematical representations serve as a symbolic language, transcending cultural and linguistic barriers, aiming to communicate the essence of human knowledge and curiosity across the vastness of space.